

WHAT IS CLAIMED IS:

- 1           1. A line interface for coupling a twisted pair telephone line with a  
2           communications network, comprising:
  - 3               a broadband analog front end circuit coupling said twisted pair telephone line  
4           with said line interface; and
    - 5               a programmable filter coupled to receive an output signal from said broadband  
6           analog front end circuit and configured to filter frequency bands of said output signal into a  
7           plurality of separate transmission channels, wherein said plurality of separate transmission  
8           channels are associated with said communications network, and wherein said frequency  
9           bands are determined by programming said programmable filter.
  - 1           2. The line interface of claim 1, wherein said communications network  
2           comprises a data network and a voice network.
  - 1           3. The line interface of claim 1, further comprising:
    - 2               an analog to digital converter circuit, coupled between said broadband analog  
3           front end circuit and said programmable filter, configured to convert said output signal to a  
4           digital signal, wherein said programmable filter is a digital programmable filter.
  - 1           4. The line interface of claim 1, wherein said plurality of separate  
2           transmission channels are directed to a plurality of different service providers.
  - 1           5. The line interface of claim 4, wherein said plurality of separate  
2           transmission channels comprise a plurality of signals with a plurality of different modulation  
3           schemes.
  - 1           6. The line interface of claim 1, wherein said programmable filter is  
2           programmed with software.
  - 1           7. The line interface of claim 6, wherein said software is downloaded to  
2           said programmable filter.
  - 1           8. The line interface of claim 1, wherein said plurality of separate  
2           frequency bands are determined according to a protocol including at least one of POTS,  
3           ISDN, ADSL, VDSL, SDSL, IDSL, HDSL, and HDSL2.

1                   9.        The line interface of claim 8, wherein said ADSL is one of full rate  
2        ADSL, G.Lite, CAP, and QAM.

1                   10.      The line interface of claim 9, wherein said ADSL and said POTS  
2        coexist on said twisted pair telephone line.

1                   11.      The line interface of claim 10, further comprising:  
2                    a POTS detector circuit coupled to provide a POTS usage signal to said  
3        programmable filter indicating that a POTS bandwidth is in use.

1                   12.      The line interface of claim 11, wherein an ADSL bandwidth is  
2        expanded to include said POTS bandwidth when said POTS usage signal indicates that said  
3        POTS bandwidth is not in use, and said ADSL bandwidth is reduced to exclude said POTS  
4        bandwidth when said POTS usage signal indicates that said POTS bandwidth is in use.

1                   13.      The line interface of claim 11, wherein said POTS detector circuit  
2        detects whether a telephone connected to said twisted pair telephone wire is on hook or off  
3        hook.

1                   14.      The line interface of claim 11, wherein said POTS detector circuit  
2        determines if a POTS signal is communicated in said ADSL bandwidth or if said POTS  
3        signal is communicated in said POTS bandwidth.

1                   15.      A method of providing a plurality of services over a twisted pair  
2        telephone line, comprising the acts of:  
3                    receiving a broadband analog signal from said twisted pair telephone line;  
4                    filtering said broadband analog signal using a programmable filter into a  
5        plurality of separate bands; and  
6                    transmitting said plurality of separate bands to a plurality of different service  
7        providers.

1                   16.      The method of claim 15, wherein said separate bands are transmitted to  
2        said plurality of different service providers through a data network and a voice network.

1                   17.      The method of claim 15, wherein said programmable filter is upgraded  
2        by programming said filter with software.